

UPPER COLORADO RIVER ENDANGERED FISH RECOVERY PROGRAM

FY 2022 ANNUAL REPORT

PROJECT: 178

Project Title

Use of Stirrup wetland by larval and adult endangered fish

Bureau of Reclamation Agreement Number:

R22PG00033

Project/Grant Period:

Start date: 10/01/2021

End date: 09/30/2026

Reporting period end date: 09/30/2022

Is this the final report? No

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Abstract:

Stirrup wetland and its associated water control structure were operated for the first time in 2022 with the objectives to 1) monitor entrainment of larval Razorback Sucker during spring peak flows, 2) examine fish community composition and habitat in the wetland following filling to access summer survival of wild-spawned Razorback Sucker, 3) monitor escapement of native and nonnative fishes during a controlled release, and 4) determine the extent of nonnative colonization in the wetland habitat. Operation and monitoring activities at Stirrup wetland resulted in the capture of 551 Razorback Sucker (mean total length = 233 mm) that we PIT-tagged and released alive into the Green River. While draining the Stirrup wetland, we also removed an estimated 81,003 nonnative fishes.

Study Schedule:

2022-Ongoing

Relationship to RIPRAP:

GREEN RIVER ACTION PLAN

II.A. Restore and manage flooded bottomland habitat.

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- II.A.5. Manage and/or modify priority floodplain sites for nursery habitat for endangered fish
II.A.5.e. Stirrup

Accomplishment of FY 2022 Tasks and Deliverables, Discussion of Initial Findings and Shortcomings:

Task 1: Install, operate and maintain the Stirrup wetland control structure and fish screen while filling wetland.

In April of 2022, fish screens built from stainless steel with vertical slots to allow larval fishes to pass through while excluding large-bodied fishes were installed on the river side of the newly constructed water control gate at the Stirrup wetland. As part of the Larval Trigger Study Plan (LTSP 2012), the Green River Basin Fish and Wildlife Conservation Office (GRBFWCO) monitors a variety of off-channel habitats along the Green River with light traps for larval Razorback Sucker under Recovery Program Project #22f. Close communication was maintained with GRBFWCO and once larval Razorback Sucker were detected near the Stewart Lake outlet upstream, larval light trapping was initiated near the Stirrup wetland water control structure. On 23 May 2022 we set four larval light traps in the zero-velocity outlet channel. When retrieved the following morning, all four traps contained Red Shiner and two traps contained presumed Razorback Sucker larvae ($n = 3$). Larvae were preserved in 95% ethanol and taken to GRBFWCO for preliminary identification (awaiting confirmation from Colorado State University's Larval Fish Lab). Light traps were deployed for two more nights and on the morning of 25 May 2022 ten more Razorback Sucker (RZB) larvae were captured, and on 26 May 2022 nine RZB were captured on the riverside of the water control structure. With the detection of larval suckers near the wetland, plans to fill the wetland commenced.

Filling of Stirrup wetland was planned to coincide with LTSP flows (Figure 1). The wetland gate was partially opened on 24 May 2022 (one day prior to the expected arrival of LTSP flows from Flaming Gorge Dam) to saturate the soils in the wetland so filling could start when the river stage began to rise. Water continually flowed into the wetland from 24 May 2022 to 01 June 2022. The Stirrup control gate was calibrated and digitally recorded inflow at all times. Gate flow measurements indicated 190-acre feet of water entered the wetland during filling. Less than ten gallons of debris accumulated and was removed from the inlet screens during filling. When filling was complete, the water depth in the fish kettle was 2.5 m with a large portion of the wetland over 2.1 m deep. While the wetland could have been filled faster, an attempt was made to slowly fill during the entire LTSP release to maximize larval entrainment.

Task 2: Sample the Stirrup wetland fish community and monitor post-connection water quality.

While the wetland was filling two light traps were set in the kettle on 24, 25, and 30 May 2022. Five RZB were captured during that effort. Additionally, four light traps were set along the south shore of the wetland on 30 May 2022, and 24 RZB were caught. Following this verification of larval entrainment into the wetland, we discontinued light trapping activities.

To assess fish survival and community composition in the wetland, six minnow traps baited with dog food were set in the wetland on 03-04 August 2022. Minnow traps were used because the fyke nets that were ordered to conduct this monitoring were on backorder and had not yet been delivered. The following fish were caught during in minnow traps: 48 Red Shiner, 99 Green Sunfish, 36 Fathead

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Minnow, and one unknown catostomid (77 mm total length). Photographs of the unknown catostomid were shared with Recovery Program staff, but a definitive identification was not possible from pictures alone.

After wetland filling was complete, two mini-DOT loggers were placed in the wetland on 02 June 2022 attached to t-posts in two wetland locations to monitor dissolved oxygen and water temperature throughout the summer with a summer peak of 30.0° C. Dissolved oxygen concentrations were between 0.05 mg/L and 15.08 mg/L. No fish mortality was observed, and fish survived until the fall draining activities.

Task 3: Sample fishes exiting Stirrup wetland control structure during drawdown using the built-in fish kettle.

In October 2022, the fish screens were moved from the river side of the water control structure to the wetland side in preparation for draining. On 10 October 2022 the water control gate was lowered and draining of the wetland began. Red Shiner were observed passing through the fish screen and escaping to the river at this time likely leading to an underestimation of their abundance in the wetland. When draining commenced, water depth in the kettle was 1.4 m. The wetland was drained through the water control structure to a depth of 0.9 m in the wetland, at which point water would no longer flow out the gate and an 8" water pump was brought in from GRBFWCO to continue draining the wetland. This effort took longer than anticipated with an estimated 120 hours of running the pump and 140 gallons of diesel fuel. Using the pump, the wetland was drained until 0.25 m of water remained in the kettle, and less than 0.1 m of water was in the wetland area. The pump could not be used any more due to the height of the intake screen, at which point the pump began to suck air into the intake pipe. Draining was conducted from 10-14 and 17-22 October 2022. When draining was complete, there were no pockets of deeper water in the wetland, the drainage channel and kettle were the deepest part of the wetland effectively bringing fish to the kettle for capture.

The fish kettle was seined once per day while actively draining with one last fish check on 24 October 2022. Most days included at least one seine haul through the wetland channel leading to the outlet gate to push fish into the kettle for capture. Nonnative fish abundance was estimated by subsampling 1qt of fish from a large cooler (uniformly mixed), enumerating and identifying the species in that quart and multiplying the count by the total number of quarts of nonnative fish. This resulted in an estimate of 52,836 Fathead Minnow, 25,212 Red Shiner, 1,800 Sand Shiner, 1,155 Green sunfish (Table 1).

Native fishes captured during wetland draining were 551 Razorback Sucker with an average total length of 233 mm (Figure 2) and weight of 152 grams ($n = 276$); not all the fish were weighed due to windy conditions interfering with scale accuracy. In addition, four Flannelmouth Sucker were caught (111-150 mm length), and 1 presumed Razorback x Flannelmouth Sucker hybrid. Fin clips were preserved for the presumed hybrid and one Flannelmouth Sucker for genetic analyses. All RZB captured were held in large coolers which acted as live-wells, weighed, measured, PIT-tagged, held in another cooler for recovery and observation then released alive into the Green River.

Task 4: Data entry, analysis and reporting.

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- Data was formatted to the STReaMS database template and submitted for upload on 14 November 2022.
- Fin clips for genetic analysis will be transferred to Tildon Jones before 01 December 2022

Additional noteworthy observations:

- Common carp were absent in the wetland.
- Erosion was observed on the sides of the water control structure on the river side of the control gate (Figure 3).
- Razorback Sucker appeared robust and healthy (Figure 4).

Recommendations:

- Removable fish screens to place between the kettle and the wetland are needed before this project continues. Temporary screens were used this year, but sturdier screens need to be built to keep fish from escaping from the kettle to the wetland during seining efforts. Concrete infrastructure is already in place for the screens.
- Continue to monitor presence of carp in Stirrup wetland and average size of RZB at the end of the season. If the results from this year repeat (no carp and large RZB) it could warrant study to determine if absence of carp is a causal factor in rearing large RZB.
- Begin draining earlier to reduce the risk of aquatic vegetation dying off in the wetland and affecting dissolved oxygen levels due to decomposition.
- There is gravel leftover from construction; it should be placed on the earthwork near the riverside of the water control gate to minimize erosion potential. This can be accomplished through a work request to the Vernal BLM's operations crew.
- Submit a work request to the Vernal BLM operations crew to move the fish screens using heavy equipment; this will reduce injury risk associated with moving the heavy screens manually.
- At the end of the season the water control gate would not respond to remote commands; adjustments had to be completed on-site. Also, the water level sensors will need to be re-calibrated. A call and possible work order will need to be completed with Rubicon.

Project Status:

On track, ongoing.

FY2022 Budget Status

Funds Provided: \$30,578.28

Funds Expended: \$25,386.79

Difference: \$5,191.49

Percent of the FY 2022 work completed, and projected costs to complete: 83%

Recovery Program funds spent for publication charges: -\$0-

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Status of Data Submission

Data formatted and submitted to Christopher Michaud on 11-14-2022.

Signed:

Jerrad Goodell & Matthew J. Breen

Principal Investigators

Date 11-16-22

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Table 1. Percent composition of nonnative fish collected during the draining of Stirrup wetland in 2022.

Species	Total	% Composition
Fathead Minnow	52,836	65.2
Red Shiner	25,212	31.1
Sand Shiner	1,800	2.2
Green Sunfish	1,155	1.4

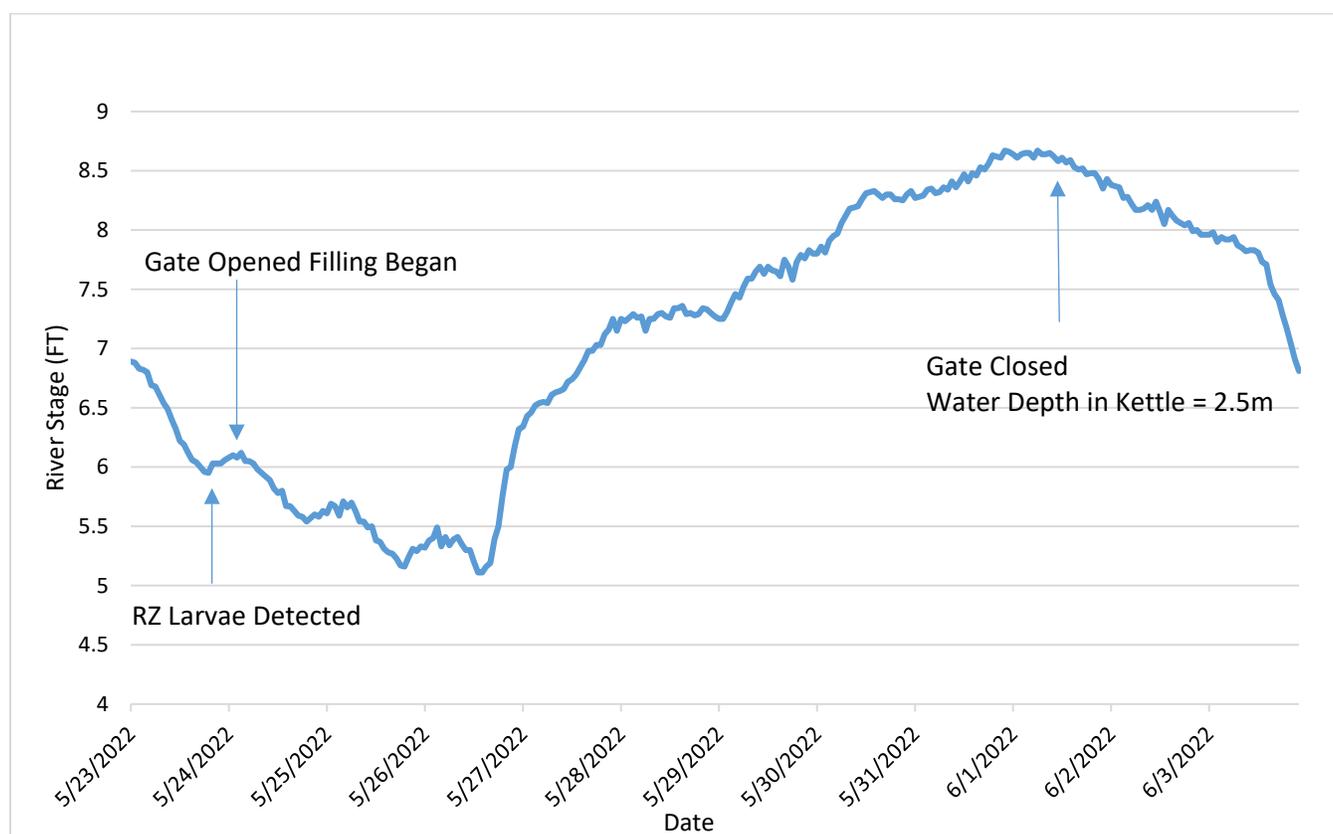


Figure 1. Hydrograph of flows monitored at the USGS gage at Jensen, Utah (gage #09261000) in relation to larval Razorback Sucker detection and gate operation at the Stirrup Wetland.

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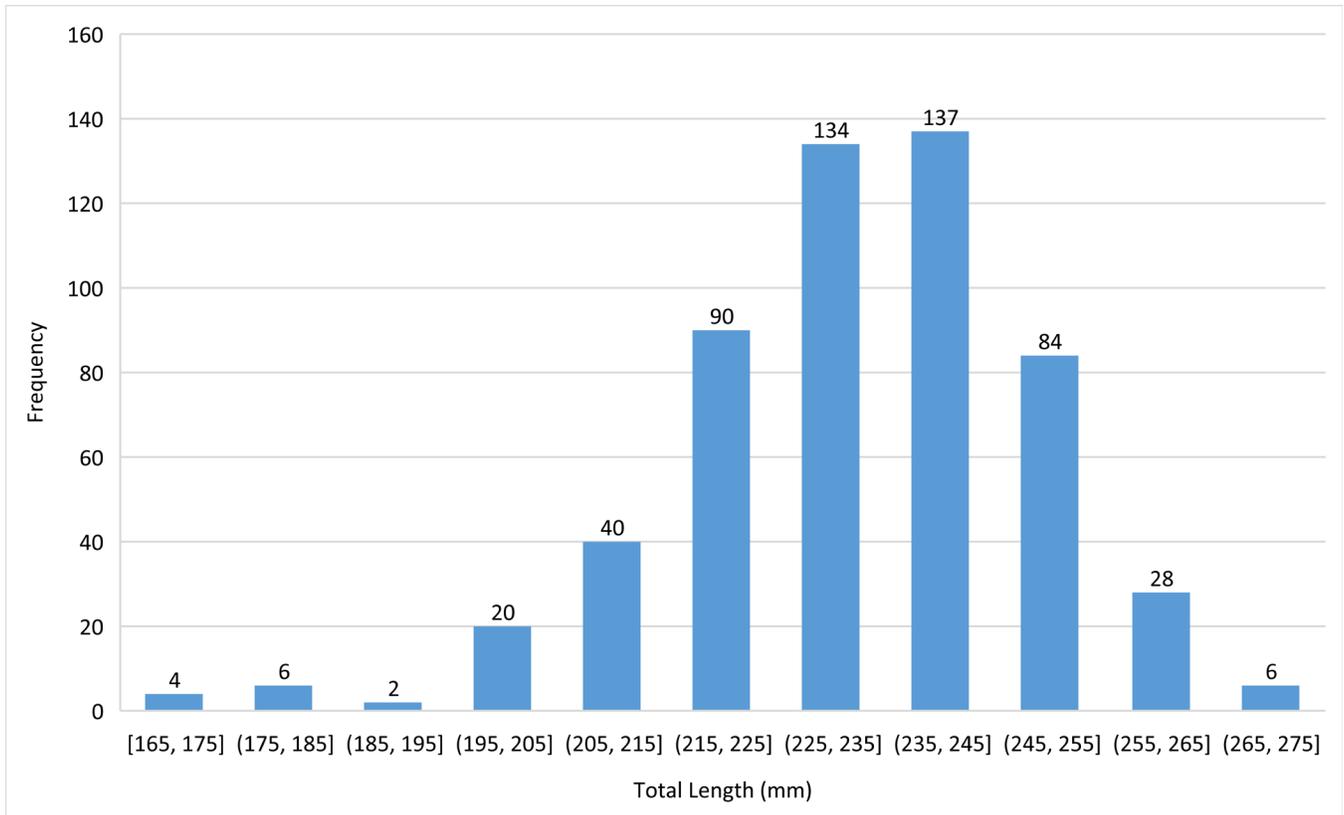


Figure 2. Length-frequency histogram of Razorback Sucker sampled during draining of Stirrup wetland 2022.

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Figure 3. Erosion on riverside of the Stirrup wetland water control structure.



Figure 4. Razorback Sucker from Stirrup wetland.

Literature Cited

Larval Trigger Study Plan Ad Hoc Committee (LTSP). 2012. Study plan to examine the effects of using larval razorback sucker occurrence in the Green River as a trigger for Flaming Gorge Dam peak releases. Upper Colorado River Endangered Fish Recovery Program, Denver, CO.